Recherche

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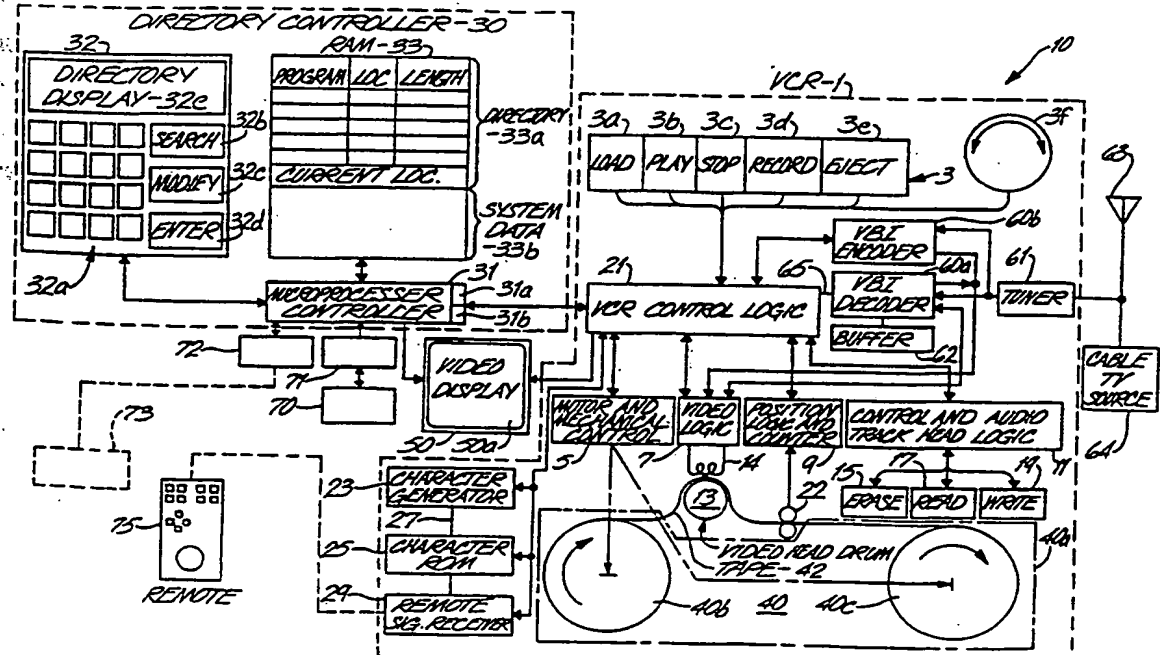
(57) Abstract

Operation of a video cassette player is facilitated by providing a VBI decoder which decodes information, such as title, channel, date, time and length of broadcast programs and utilizing the information in providing directory of the programs as well as control of the VCR. The video cassette player is also provided with a VBI encoder for inserting control as well as directory information into the tape, either in the VBI portions of the video track or in the control track.

of the program having the input number, and a screen, such as FIG. 91b, is displayed (step 2724).

After the tape is moved to the selected program, the function specified by the non-number key is then performed (step 2725).

Playing A Recorded Program

Referring to FIG. 90c, when the "PLAY" key is pressed (step 2731), the microprocessor controller 31 waits until the tape stops moving (step 2732). When the tape stops, the microprocessor controller 31 retrieves directory information of the program (step 2733) and displays it on a screen (step 2734) as shown in FIG. 91c for a few seconds. Thereafter, the microprocessor controller 31 initiates the VCR to play the cassette (step 2735). The time of occurrence of the play command and the title of the viewed program are stored in the monitoring data memory 33c of the RAM 33. Optionally, in the first few seconds after the tape is started, the word "PLAYING" is displayed on the screen (step 2735). The VCR continues to play the tape until it reaches the end of the program as indicated by either the change in a PN in the TPA packet, upon reaching a VISS mark, a match of the current absolute address with the stop address or until it receives a STOP command. Upon stopping, the microprocessor controller 31 displays a directory.

Alternatively, the stopping may be disabled by the user's request or if a "continue play" flag in the VM packet 2607' is set.

Instant Recording

Instant recording is an option which allows a user to record a program for a selected length of time. The option can be initiated at any time instant, whether the user is watching a television broadcast or a taped program. Referring to the flow-chart shown in FIG. 90d, when the microprocessor controller 31 is interrupted by the RECORD key (step 2741), it displays a screen, such as FIG. 91d, to prompt the user to enter the length of recording desired (step 2742). The length can be entered as a three-digit number representing the number of minutes desired (step 2743). Numbers with less than three digits are appended by leading zeros, either automatically or manually, depending on the implementation. The entered numbers are confirmed by the "ENTER" key (step 2744). If three zeros are entered, they are interpreted as a "CANCEL" command (step 2745).

Instant recording may be initiated when the tape is positioned within a recorded program, within a blank space, or at the end of the tape (step 2746). When the microprocessor controller 31 receives the "ENTER" key, it checks the current tape position against the tape directory (step 27410).

If the current tape position is at a blank area which has a length equal to or longer than the entered length of the recording (step 27411), the microprocessor controller 31 initiates a Recording Procedure to record the program (see FIG. 90e).

Referring now to FIG. 92a, there is shown a flow chart illustrating the general steps of the Recording Procedure. When an appropriate tape segment is found, the address of the

1 if the program title is transmitted, it is read and displayed on the screen (step 27416) next to the word "RECORDING".

Referring back to FIG. 90d, if the current position of the tape is at a non-blank segment (step 27412) or if the current position is at a blank segment but the blank's length is shorter than the length of the desired recording (step 27413), the microprocessor controller 5 31 performs a search procedure to select the directory for an appropriate segment for performing the recording. The appropriate segment can be selected in several ways. One way is to search, starting from the beginning of the directory, for the first blank segment whose length is longer or equal to the requested length of the recording. If the programs 10 recorded on the tape are as shown in FIG. 91f and the required length of the recording is 20 minutes, segment #4 (length=120 minutes) will be selected. However, such selection would cause inefficient use of the tape. Therefore, another way is to search the directory for the shortest blank segment whose length is longer or equal to the required length of the recording. Using the example of FIG. 91f, segment #6 (length=24 minutes) will be used. 15 In this way, segment #4 can be used for recording a longer program.

Returning to FIG. 90e, after the microprocessor controller 31 searches for an appropriate segment, it displays a warning screen, such as the screen shown in FIG. 91e, on the screen (step 27417), suggesting to the user to perform the recording on segment #6.

After the warning screen of FIG. 91e is displayed, the microprocessor controller 31 20 monitors for an input from the user (step 27418). If the user presses the RECORD key (step 27419), the microprocessor controller 31 then performs operations described in steps 27414, 27415 and 27416 described above. If the user presses the CANCEL key (step 27420), the recording is cancelled and the previous screen is displayed (step 27421). If the user presses the number key that corresponds to the number shown on the screen (step 27422), the 25 microprocessor controller 31 moves the tape to the position corresponding to the entered number (step 27423) and starts recording. When the tape is moved, a screen such as FIG. 91b is shown.

During all recording, whether instant or timer, the microprocessor controller 31 writes, in one embodiment, a TPA packet on a line (typically line 19) of the VBI. (In 30 another embodiment, a TP packet is written.) For PR tapes, a DN packet is written on a line (typically line 20). After a recording, the program information in the DN packet is stored in RAM.

It is preferred to start each recording at the end of a previous program to minimize blank or dead space between recordings.

35

VCR PLUS+™ RECORDING

The VCR can optionally be initiated to perform a "PLUSCODE™" number recording, in a similar way as a VCR PLUS+™ remote controller from Gemstar Development Corporation of California. "PLUSCODE™" number recording is also described in U.S. 40 patent application serial number 07/676,934 filed March 27, 1991 and is incorporated herein by reference. "PLUSCODE™" and VCR PLUS+™ are trademarks of Gemstar Development

1   user. If the flag allows access, the VCR returns to step 9802 to continue monitoring the VBI (step 9806). The compare between the program being viewed and the parental control flag is done periodically, for example every minute, to prevent long periods of unauthorized viewing before the next comparison.

5   If the program is restricted, the microprocessor controller 31 stops and disables the VCR (step 9808) and displays on the screen 50a the message "parental control: please enter password to reset" (step 9810). The microprocessor controller 31 ignores VCR control commands and channel number commands. The VCR continuously requests the password to be entered until a proper password is entered (step 9812). Alternatively, the VCR may

10 allow a fixed number of incorrect passwords before ignoring all passwords for a predetermined time. When the correct password has been entered, the VCR restores control to the user (step 9814) and sets the password flag (step 9816). Setting the password flag allows the authorized viewer to continue watching the show or recording it without being periodically interrupted for a password request.

15 In an alternate embodiment, the controller 31 allows the user to select channels other than those that are forbidden. Alternatively, different passwords allow television shows to be blocked for some viewers such as children under age 13 but allows others, such as children above age 13, to view the shows, while restricting the children above age 13 from watching another show.

20

Specific Implementation

FIGs. 97a-97l' are schematic views of displays according to a specific implementation of the invention.

A new blank tape is prepared for indexing by inserting the blank tape into the VCR

25 and pressing the index button 1315 on the remote controller 9700. By using the cursor buttons 1305, the user highlights "Blank Tape" on the screen shown in FIG. 97k' and presses the enter button 1303 and selects new tape from the menu (FIG. 97a). The microprocessor controller 31 displays the display shown in FIG. 97b and prompts the user to enter the length of the tape. Using the keypad 1302 the user enters the length of the tape, e.g. 120 is entered

30 for a 2 hour tape. The user presses the enter button 1303 if he has entered the correct time in minutes or the cancel button 9706 if he has made an error and then reenters the correct number. When the tape is ejected, the microprocessor controller 31 displays the tape number and requests the user mark the housing as shown in FIG. 97c-97d.

When recording either in conjunction with VCRPlus+™, on-screen time programming

35 or instant programming using the indexing VCR, the VCR reads the program identification from the VBI. If no program title is being broadcasted, the microprocessor uses the date, time, and channel of the program as the title. When recording a program, the indexing VCR informs the user whether sufficient space is available on time for the recording. The user first inserts the tape into the VCR and programs the VCR to record a program. The user

40 then presses the review button 9714 and reads the display shown in FIG. 97e as to whether the tape has sufficient capacity. If the user is recording using instant recording (i.e.

recording at that moment by pressing the record button 1312), he first presses the index button 1315 to get a program directory as shown in FIG. 97g. The current location on the tape is marked by an arrow. If the user wants to move to a different location on the tape, he uses the cursor keys 1305 and the record button 1319 to change the location. The user is prompted to enter the length of the program to be recorded (FIG. 97f). If sufficient blank space is available at the location on the tape, the VCR begins to record for the specified time. Otherwise, a warning is displayed (FIG. 97j). Pressing the enter button 1303 overrides the warning. Pressing the cancel button 9706 cancels the recording request.

An indexed tape is viewed by inserting the tape into the VCR and pressing the index button 1315. A directory is displayed (FIG. 97i) and the user makes a selection by highlighting the desired program using the cursor keys 1305 and pressing the play button 1317. The VCR then fast forwards or rewinds to the highlighted program. Alternatively, an arrow in reverse video pointing to the destination program may be displayed on the directory during the search. The arrow on the directory moves according to the location on the tape and the selected program is played automatically. During play, the directory can be viewed by pressing the index button 1315.

A program may be erased from tape by pressing the index button 1315 and using the cursor to highlight the program to be erased (FIG. 97i). The erase button 9715 is pressed; and, as shown in FIG. 97i, the user presses the enter button 1303 to confirm the erasure or the cancel button 9706 to cancel the request. Once enter is pressed, the title in the directory is replaced with "BLANK." If two consecutive blank periods occur after the erasure, the microprocessor controller 31 combines them into one entry in the directory. The program is not actually erased from the tape, but only removed from the directory.

A program title is edited by pressing the index button 1315 and highlighting the title of the program to be changed (FIG. 97k). The edit button 9713 is pressed and using the cursor keys 1305 the title is changed (FIG. 97l) and the new title entered by pressing the enter button 1303. Pressing the cancel button 9706 cancels the new title.

A program is searched in the library with or without a tape in the VCR by pressing the library button 9710 and selecting search using the cursor keys 1305 and the enter button 1303 (FIG. 97m). Highlighting program list and pressing the enter button 1303 allows a search by program title (FIG. 97n). Using the cursor keys 1305 and the enter button 1303 to select the first letter of the program title, a list of program titles starting with the letter selected is displayed. (FIG. 97o) The page up button 9704 and the page down button 9705 are used to review the list of program titles (FIG. 97p). Highlighting tape list and pressing the enter button 1303 allows the user to search by tape number (FIG. 97q). The keypad 1302 and the enter button 1303 are used to select the tape number to be searched (FIG. 97r) and displayed (FIG. 97s). Highlighting category and pressing the enter key 1303 allows searches by category (FIG. 97t). The cursor keys 1305 are used to select the category (FIG. 97u-97v) and the page up button 9704 and the page down button 9705 are used to review the list of program titles in the selected category (FIG. 97w).

A tape may be deleted from the library or the RAM 33 by pressing the library button

1   9710 and selecting using the cursor keys 1305 and the enter button 1303 registration from the menu of FIG. 97x and delete from the subsequent menu of FIG. 97y. The user then enters the tape number assigned to the tape to be deleted (FIG. 97z). The user may review the program before erasing it from the directory. By pressing the enter button 1303, the

5   microprocessor controller 31 erases the tape number from the RAM 33 (FIG. 97a'). In the preferred embodiment, the program is not erased from the tape, but only the index of it is erased from the RAM 33.

When a tape is loaned to a friend, the directory is downloaded from the VBI at the end of the tape into the RAM 33 by pressing the library button 9710 and selecting, using the

10   cursor keys 1305 and the enter button 1303, download from the menu on the screen shown in FIGs. 97b', c', d'.

A person may adopt a tape indexed in another's VCR by adding the contents of the new tape to the RAM 33 of their VCR. The tape is inserted into the VCR and the library button 9710 is pressed. Using the cursor keys 9725 and the enter button 1303, the user

15   selects registration from the screen shown in FIG. 97e' and selects add from the subsequent screen shown in FIG. 97f'. The VCR reads the directory from the VBI at the end of the tape. The microprocessor controller 31 assigns a new tape number which is displayed on the screen. This adopt feature may also be used to add the directory from a PR tape to the RAM 33.

20   Tape identification numbers may be changed by pressing the library button 9710 and using the cursor keys 1305 to highlight registration as shown in FIG. 97g'. The cursor keys are then used to select Change from the display shown in FIG. 97h'. Using the keypad 9708 the user can change the tape number (FIG. 97i'). Overwriting of numbers previously used is avoided (FIG. 97j'). This number is preferably changed before recording the program.

25   This feature is useful when multiple tapes are required for a single show, such as a 3 part mini-series that is recorded on different tapes.

Tapes may be retroactively indexed by selecting retroindex in FIG. 97l' and following the steps of FIG. 89. By pressing the "i" button 9721 in response to a flashing icon on the TV screen such as a flashing "i," the user is able to obtain additional information on products

30   or services offered in TV commercials or on regular programs. This additional information may be detailed weather, traffic, sport scores, or financial information. Pressing the "i" button 9721 automatically programs the VCR using the "PLUSCODE™" numbers by transferring the numbers from temporary RAM to non-volatile RAM. By pressing the "R" button, the user can later review and manipulate a directory of the text information stored.

35   The cursor buttons 1305 and the enter button 9709 are used to select information.

The user may identify the program while he is viewing a current broadcast or a recorded program by pressing the PGM ID button 9724 which then displays the program title, its length, the day and date of the broadcast (or recording) and the station name or call letters as shown in FIG. 97h. If a program is being recorded that overruns its scheduled

40   time (e.g. a sporting event), the VCR automatically extends the recording time of the preprogrammed recordings for programs broadcasted by a TV station that participates in

1   response thereto, the bit TDW is set to 1.

When the controller 702 is unable to keep up with instantaneous process loading, the interrupt service routine disables interrupts and then reenables such interrupts when all data has been processed.

5

Alternate Embodiments

In an alternate embodiment to all systems using pointers, the indexing VCR 10 has a VBI decoder capable of decoding all lines of the VBI or at least those lines containing relevant information. In this embodiment, pointers are not used, because the VCR processes

10 all lines of the VBI. After reading all lines, the microprocessor controller 31 identifies the data by the type symbol. Subsequent processing of the data then continues as it does in a pointer system.

In one embodiment, the indexing VCR 10 pauses during playback whenever the user calls up an information screen, e.g., directory, timer programming, or PRI.

15   Although the embodiment of the indexing VCR 10 is described in terms of the components thereof as being included in the indexing VCR, the invention is not so limited. Various components of the indexing VCR may be integral to the VCR, a television, a cable box, separate therefrom or any combination.

Selections, such as programs to be watched, made from the screen may be done in

20 several ways. A user may move using cursor keys a cursor to point to or highlight a selection and then press the enter or select button to select the highlighted items. Alternatively, the user may enter a number next to the desired selection and then press the enter key.

In one embodiment, to reduce directory listings for programs of short length, a length

25 threshold is set so that programs shorter than the threshold are not listed in the directory. Similarly, blank spaces less than a threshold are not displayed. In one implementation, programs shorter than 3 minutes in SLP or 1 minute in SP for HR tapes and programs shorter than 2 minutes in SLP mode or 1/2 minute in SP mode for PR tapes are not kept in the directory.
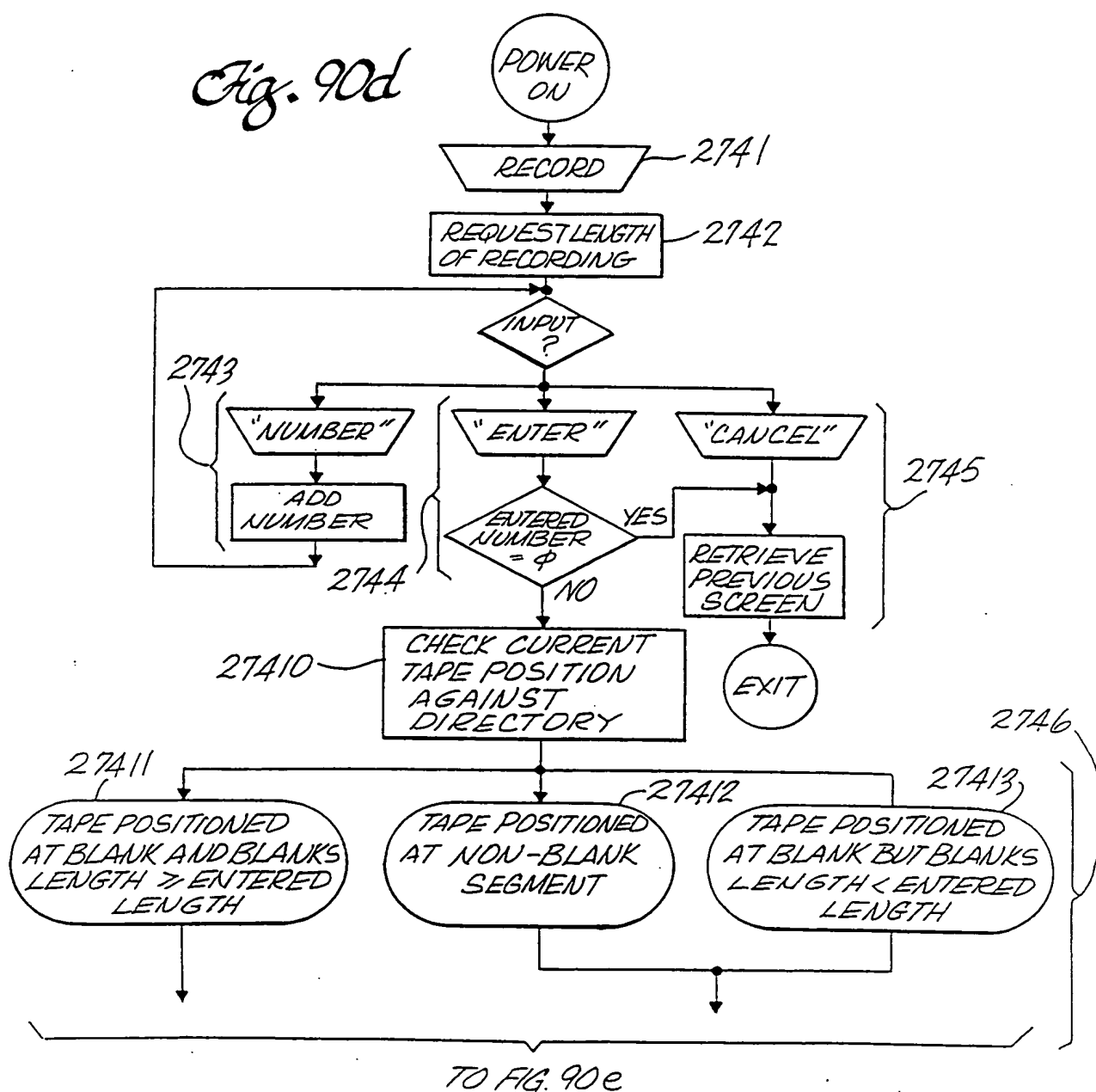
30   In the foregoing, certain values and representations are used to facilitate description and understanding of the invention. For example, operations of the microprocessor controller 31 is described as being responsive to activation of certain keys ("RECORD", "PLAY", "I", "VCR PLUS+™", etc.). It will be understood, however, that such keys may be implemented by any predefined sequence of keys. Moreover, values of electrical components are shown

35 for circuits illustrated in some of the figures, it will be understood such values are shown to facilitate implementation of the invention and the functions of the circuits can be accomplished by other values or even other components. Therefore, the foregoing description should not be read as pertaining only to the precise structures and techniques described, but rather should be read consistent with, and as support for, the following claims,

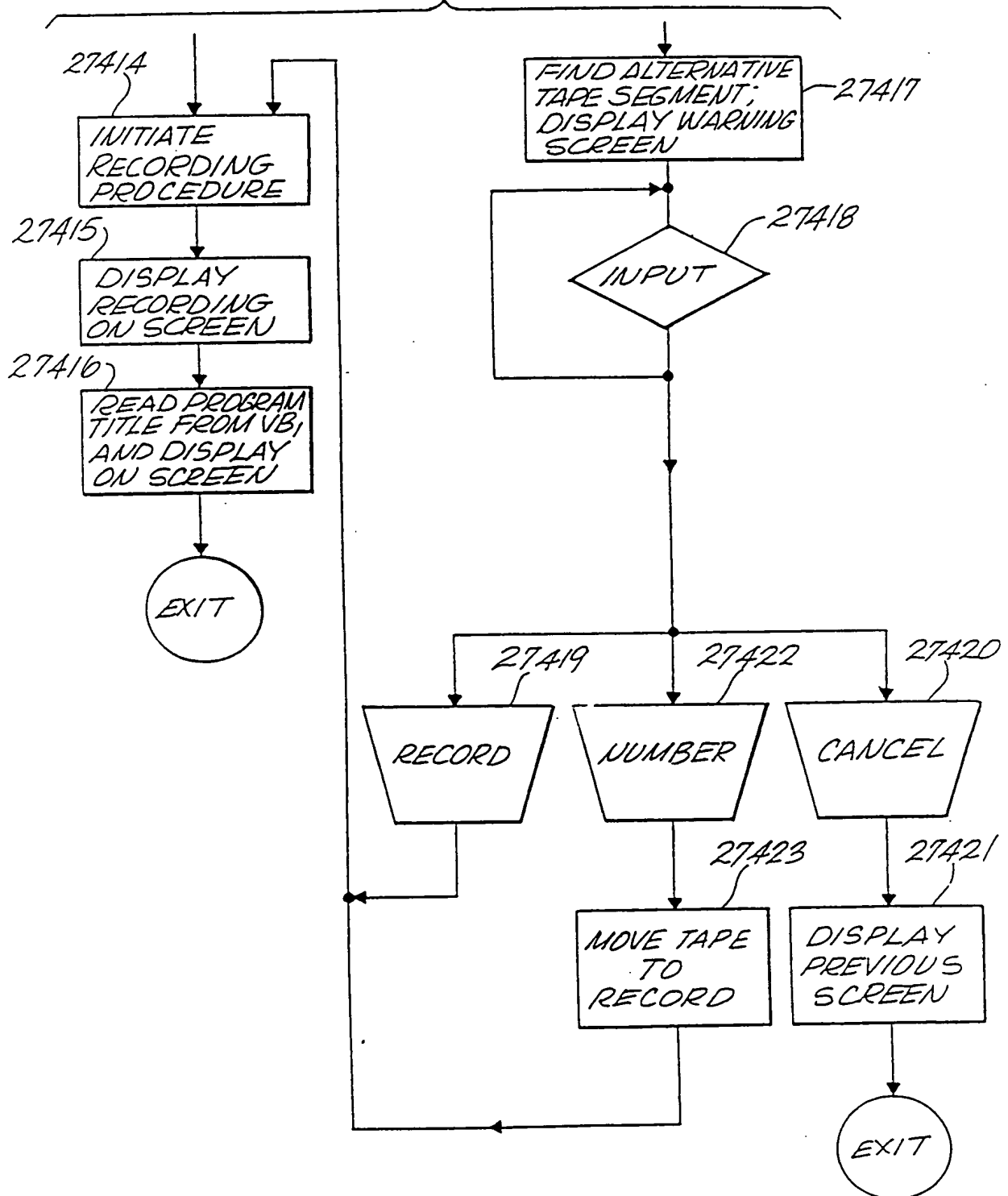40 which are to have their fullest and fair scope.

Fig. 90d

POWER ON

RECORD — 2741

REQUEST LENGTH OF RECORDING — 2742

INPUT ?

2743

"NUMBER"

"ENTER"

"CANCEL"

2745

ADD NUMBER

2744

ENTERED NUMBER = φ   YES

NO

RETRIEVE PREVIOUS SCREEN

27410 — CHECK CURRENT TAPE POSITION AGAINST DIRECTORY

EXIT

2746

27411

27412

27413

TAPE POSITIONED AT BLANK AND BLANKS LENGTH ≥ ENTERED LENGTH

TAPE POSITIONED AT NON-BLANK SEGMENT

TAPE POSITIONED AT BLANK BUT BLANKS LENGTH < ENTERED LENGTH

TO FIG. 90e

95/168

Fig. 90e

FROM FIG. 90d

106/168

Fig. 91d

ENTER LENGTH IN MINUTES

PRESS [ENTER] TO RECORD
OR [CANCEL] TO QUIT

109/168

Fig. 91e

WARNING !!!

RECORDING WILL OVERWRITE THE
FOLLOWING PROGRAMS:
      CHIP AND DALE

PRESS [5] TO RECORD AS PROGRAM#5
OR [CANCEL] TO EXIT
OR [RECORD] TO OVERWRITE